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ABSTRACT

These two curriculum guides are part of a series intended to serve as a model to aid school districts as they develop and review their own curriculum documents. The guides represent a synthesis of input from many sources, both Alaskan and national. Each guide lists topics/concepts, learning outcomes, and sample learning objectives in three columns. Topics/concepts describe the major parts of the subject under consideration and they define broadly the content to be included in the study of each subject area. Learning outcomes describe in general terms the behaviors students are expected to demonstrate as a result of their learning experiences. Sample learning objectives are indicators of student progress toward the stated goals, i.e., the learning outcomes. Both the elementary and secondary computer education curriculum guides are organized around the topics of computer operation, computer application, problem solving, and computers in society. The elementary education curriculum guide is divided into three sections: grades 1-3; 4-6; and 7-8. The secondary education curriculum guide is intended for grades 9-12. (THC)

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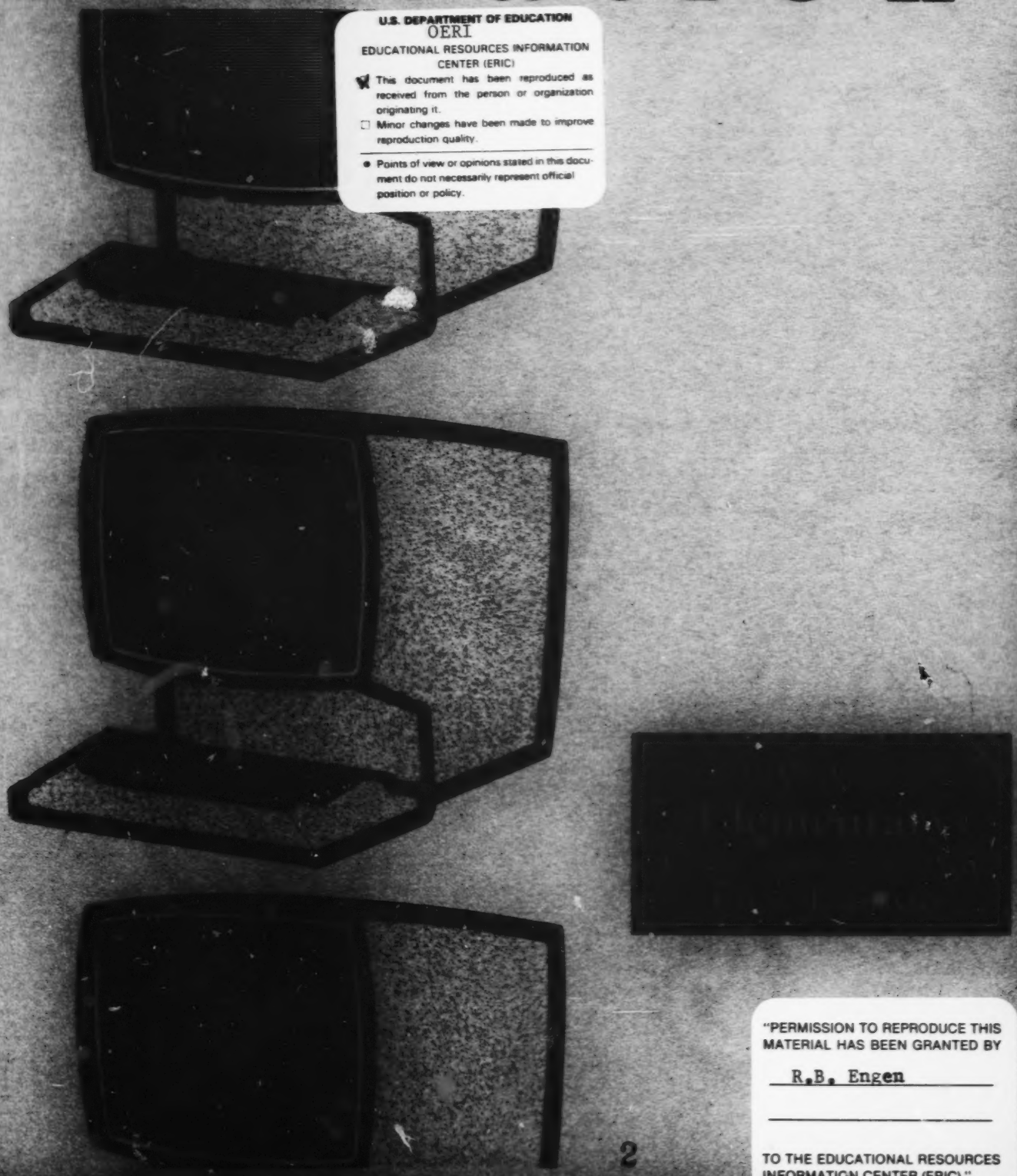
Computer Education



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ELEMENTARY COMPUTER EDUCATION

ALASKA CURRICULUM GUIDE

First Edition

Support of the Model Curriculum Project was provided through a special grant from ECIA Chapter II (Block Grant)

Alaska Department of Education

August 1985

ELEMENTARY COMPUTER EDUCATION

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"Everything educates, and some things educate more than others."

Harold Taylor

PREFACE TO THE SERIES

Among the many decisions that schools must make, none is more important than the choice of curriculum. Curriculum defines the intent behind instruction and the expectations for student performance. This first field edition curriculum guide is one of a series intended to serve as a model to aid school districts as they develop and review their own curriculum documents. It is not intended that any of these field edition guides be used directly by teachers for instructional purposes. Districts are expected to develop their own locally suitable curriculum based on these guides. Districts have or are developing their own locally suitable curriculum using these guides as a base and point of departure. In the future as schools use this material to plan and implement programs, its value will be measured by the increased abilities of students to learn, think, and perform as informed and productive citizens.

In their present form these guides represent a synthesis of input from many sources, both Alaskan and national. They were originally prepared by staff at the Department of Education with the help of professional content associations, Alaskan teachers and administrators. An extensive review and revision process was conducted in 1984-85. School districts, subject matter associations, other professional associations, and interested individuals provided input to a revision process that was contracted to the Northwest Regional Educational Laboratory. A panel of nationally recognized curriculum specialists assisted in the review of each content area. contributors to specific guides are listed in the acknowledgements sections of those guides. In

one sense, these guides will never be finished. It is the intention of the Department of Education that they be dynamic documents subject to revision every few years as part of the six year curriculum review cycle that was recently initiated by new curriculum regulations. Guides exist in the areas of:

Kindergarten	Fine Arts
Language Arts	Social Studies
Science	Computer Education
Foreign Languages (Secondary)	Health
Mathematics	Physical Education

The format of the guides is straightforward but not oversimplified. Each guide lists topics/concepts, learning outcomes, and sample learning objectives in three columns. (In the case of Secondary Foreign Language, the first column is headed topics/skills.)

Topics/concepts, in the first column, describe the major parts of the subject under consideration. They define broadly the content to be included in the study of each subject area.

Learning outcomes, in the second column, describe, in general terms, the behaviors students are expected to demonstrate as a result of their learning experiences. Learning outcomes are the goals toward which student learning is directed.

Sample learning objectives, shown in the third column, are indicators of student progress toward the stated goals, i.e., the learning outcomes. At least one sample learning objective is stated for each learning outcome. It is intended that the sample learning objectives are just that: samples only. They do not constitute a learning program. School districts generate their own locally applicable learning objectives within the framework of their district topics/concepts and learning outcomes.

The guides are grouped by grade level groupings (except Mathematics) -- grades 1-3, 4-6, 7-8 for the elementary level, and 9-12 for the secondary level. Mathematics is presented sequentially grade by grade. Recognizing the unique characteristics of the five year old learner, Kindergarten was prepared as a separate guide. In the development, grades 7-8 were generally seen as the end of the elementary years, but with some beginnings for the secondary level. On the secondary level the guides generally contain discrete courses that would be offered; these are not always tied to a particular grade level as the local district must determine the most effective sequence for those courses.

The Alaska State Board of Education stated, "The Model Curriculum Guides are intended to serve as a model, not a mandate." They underscored the fact that a partnership between state and local school districts is crucial. We seek to promote individual variation while stressing the collective responsibility for educating all students in Alaska. It is in this spirit that the Department of Education welcomes the opportunity for continuous collaboration with those interested in the further development and refinement of this entire series of guides.

PREFACE TO

ELEMENTARY COMPUTER EDUCATION CURRICULUM GUIDES

Computer literacy is essential for every individual in today's technological society. All students need to have the knowledge and skills that will enable them to use computers effectively. Instructional programs in the State of Alaska should provide the opportunity for all students to learn to use computers as appropriate for each individual's age, needs and desires.

The Department of Education supports:

1. The integration of computer usage and word processing throughout the curriculum.
2. The provision of structured and unstructured learning opportunities.
3. The use of computers by students to reinforce and extend skills and concepts taught.
4. The use of computers by teachers to demonstrate and/or teach selected skills and concepts and to assist with record keeping and the generation of classroom materials.
5. The use of computers to teach problem solving skills and in solving problems.
6. The involvement of community members and students, as well as certified staff, for computer instruction.

Both the elementary and secondary curriculum guides are organized around the topics of computer operation, computer application, problem solving, and computers in society. An attempt has been made to keep this guide flexible so that it can be applied throughout Alaska. The purpose of the elementary curriculum guide can be accomplished by integrating the computer into the general instructional program for younger students. There has also been a conscious effort to avoid specifying particular programming languages and devices which could become quickly obsolete.

ACKNOWLEDGMENTS

The State Department of Education appreciates the assistance of the following Alaskan educators as well as its own staff who participated in developing this document. The Guide could not have been produced without their help.

Charlie Arteaga, Ketchikan
Paul Berg, DOE
Sandra Burgess, Northwest Arctic
Mike Chmielewski, Palmer
Cathy Chmielewski, Fairbanks
Ann Collins, consultant
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Jerry Myers, Skagway
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Marcia Romick, Fairbanks
Mary Sanders, Kenai
Bob Silverman, DOE
Tamara Smid, Bethel
Kathy Wayne, Wrangell
The entire faculty of St. Mary's School

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ELEMENTARY COMPUTER EDUCATION
GRADES 1 - 3

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
COMPUTER OPERATION		
Understanding and using the vocabulary, definitions and operational procedures associated with computers and their peripherals as appropriate to needs and interest.		
	Operate a computer.	
		Turn the system on and off, boot a disk. Call the teacher if the disk does not boot.
		Run programs from a menu.
		Use the keyboard (including special keys in grade 3).
	Demonstrate proper care and handling of computer hardware and software.	
		Demonstrate proper disk care and handling.
		Demonstrate proper keyboard care and handling.
	Use peripheral devices.	
		Demonstrate proper care and handling of peripherals.
		Use output devices such as printer, speech synthesizer, etc.

ELEMENTARY COMPUTER EDUCATION
GRADES 1 - 3

TOPIC/CONCEPT	LEARNING OUTCOME	SAMPLE LEARNING OBJECTIVE
	The Learner will:	The Learner will:
COMPUTER APPLICATION Using computer hardware and software as tools and application of this knowledge to the solution of problems.		
	Use hardware and software in order to solve problems.	
		Use word processing readiness programs such as Story Machine, Kids on Keys, Magic Slate, etc.
		Use thinking skills programs such as Rocky's Boots, Gertrude's Puzzles, Factory, etc.
PROBLEM SOLVING Developing problem solving skills by understanding and using programming languages.		
	Develop skills to teach the computer to solve problems	
		Use introductory graphics programs such as Delta Drawing, MECC Pictures and LOGO.
		Use programming readiness programs such as Face Maker, Creature Creator and Muggles.

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
COMPUTER OPERATION Understanding and using the vocabulary, definitions and operational procedures associated with computers and their peripherals as appropriate to needs and interest.	Operate a computer	Change from one piece of software to another. Run programs from a menu, catalog or directory. Demonstrate what to do if the disk does not boot. Use appropriate vocabulary.
	Demonstrate proper care and handling of computer hardware and software	Demonstrate proper disk care and handling. Demonstrate proper computer care and handling. Demonstrate proper care and handling of peripherals.

ELEMENTARY COMPUTER EDUCATION
GRADES 4 - 6

TOPIC/CONCEPT	LEARNING OUTCOME	SAMPLE LEARNING OBJECTIVE
	The Learner will:	The Learner will:
COMPUTER OPERATION (Cont.)	Use peripheral devices	
		Use input devices such as mouse, voice, light pen, graphics pad.
		Use output devices such as printer, speech synthesizer.
COMPUTER APPLICATION: Using computer hardware and software as tools and apply this knowledge to the solution of problems.		
	Use software and hardware in order to solve problems.	
		Use software such as word processor, filing programs, utilities.
		Use thinking skills software programs such as Rocky's Boots, Gertrude's Puzzles, Factory.
PROBLEM SOLVING: Developing problem solving skills by understanding and using programming languages.		

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
PROBLEM SOLVING (Cont.)	Write programs to solve problems.	Program the computer to create graphics. Program the computer to perform arithmetic operations.
COMPUTERS IN SOCIETY Being familiar with: (1) the technical development of computer devices. (2) the impact of technology on society. (3) career, vocational, home, and recreational areas of computers. (4) emerging roles of computers and ways to make use of them in a changing society.	Describe personal and vocational uses of the computer.	Identify careers/vocational uses. Identify home uses for computer, word processor. Identify the recreational uses of computers.

ELEMENTARY COMPUTER EDUCATION
GRADES 4 - 6

TOPIC/CONCEPT	LEARNING OUTCOME	SAMPLE LEARNING OBJECTIVE
	The Learner will:	The Learner will:
COMPUTERS IN SOCIETY (Cont.)		
	Differentiate between responsible and irresponsible uses of computer technology.	
		Use computers in ways which do not neglect or violate the rights of others.
	Identify the positive and negative impact of computer technology on society	
		Describe the advantages of using computers.
		Describe the disadvantages of using computers.

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
COMPUTER OPERATION: Understanding and using the vocabulary, definitions and operational procedures associated with computers and their peripherals as appropriate to needs and interest.	Operate a computer.	Use the keyboard including special keys. Locate appropriate information in operating manuals. Use appropriate vocabulary.
	Use peripheral devices	Use input devices such as mouse, modem, voice, light pen, graphics pad. Use output devices such as printer, speech synthesizer. Use robotic devices.
COMPUTER APPLICATION: Using computer hardware and software as tools and apply this knowledge to the solution of problems.	Use software and hardware in order to solve problems.	

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
COMPUTER APPLICATION (Cont.)		
		Use word processing software.
		Use data bases and information retrieval systems.
		Use spread sheet software.
		Use filing system software.
		Use utility software.
	Identify the major areas of computer application.	
		Will identify applications such as information retrieval, simulation and modeling, process control and decision making, computation, data processing and word processing.
		Identify why computers are used, e.g., need for speed, accuracy, repetitiveness, volume of information.
		Describe factors affecting computer use, e.g., cost, software availability, storage capacity, computer compatibility, environment.

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
COMPUTER APPLICATION (Cont.)	Identify procedures for choosing software and hardware	
		Identify characteristics of good software.
		Identify software sources.
		Identify software to solve specific problems.
PROBLEM SOLVING: Developing problem solving skills by understanding and using programming languages.		
	Write simple programs to solve problems.	
		Program the computer to draw graphics.
		Program the computer to print text.
		Program the computer to perform arithmetic operations.
		Use problem solving procedures.
	Describe the nature and purposes of computer languages and programming.	
		Predict output of a program

ELEMENTARY COMPUTER EDUCATION
GRADES 7 - 8

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
COMPUTERS IN SOCIETY: Be familiar with: (1) the technical development of computer devices. (2) the impact of technology on society. (3) career, vocational, home, and recreational uses of computers. (4) emerging roles of computers and ways to make use of them in a changing society.	Describe personal and vocational uses of the computer.	
		Describe career/vocational uses of the computer.
		Describe home uses of the computer.
		Describe recreational uses of the computer
	Differentiate between responsible and irresponsible uses of computer technology.	
		Uses computers in ways which do not neglect or violate the rights of others.

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
COMPUTERS IN SOCIETY (Cont.)	Identify the positive and negative impact of computer technology on society.	
		Describe advantages of using computers.
		Describe disadvantages of using computers.
	Demonstrate an awareness of historical developments of computing devices.	
		Identify devices for manipulating numbers.
		Identify technological advances leading to different generations of computers.
	Demonstrate an awareness of changes related to technological developments.	
		Describe changes in telecommunications.
		Describe changes in robotics.
		Describe and project new developments relating to telecommunication devices, computers, word processors, etc.

APPENDIX A

SKILL FLOW CHART

This Skill Flow Chart was created as part of The Model Curriculum development process. The chart indicates in which grade clusters learning outcomes might be introduced, extended or reviewed:

Introduced: First time a skill is presented

Extended: Previously introduced skills are reinforced

Review: Previously introduced or extended skills are reinforced and applied

The chart is offered as a structure for presenting skills at different grade levels; it is not meant to be a mandate for teaching skills at a particular grade level. Before such decisions are made, individual student abilities, differences and aptitudes must be considered.

	Grades 1-3	4-6	7-8
COMPUTER OPERATION			
Operate a computer.	I	E	E
Demonstrate proper care and handling of computer hardware and software.	I	E	R
Use peripheral devices.	I	E	E
COMPUTER APPLICATION			
Use software and hardware in order to solve problems.	I	E	E
Identify the major areas of computer applications.			I
Identify procedures for choosing software and hardware.			I
PROBLEM SOLVING			
Develop beginning computer programming skills.	I		
Write programs to solve problems.		I	E
Describe the nature and purposes of computer languages and programming.			I
COMPUTERS IN SOCIETY			
Describe personal and career uses of the computer.		I	E
Differentiate between responsible and irresponsible uses of computer technology.		I	E
Identify the positive and negative impact of computer technology on society.		I	E
Demonstrate an awareness of historical developments of computing devices.			I
Demonstrate an awareness of changes related to technological developments.			I

RESPONDENTS	SUGGESTIONS	DISPOSITION
Sandra Burgess, representing Alaska Association for Computer Education		
	General: 1. Results of survey show most members feel original draft appropriate--more so than changes which were proposed.	1. Went back to original version.
	2. Every attempt should be made not to lock curriculum into concepts which would become obsolete quickly. An example of this is degree of emphasis on programming languages.	2. Agreed--provided for by going back to original version.
	Specific: The following objectives were seen as being the least in value with the implication that they should be eliminated:	
	A. Grades 1-2 1. The learner will use robotic devices such as Terrapin Turtle, Big Trak, etc.	A. Grades 1-2 1. Eliminated.
	2. . . . use input devices such as mouse, voice, light pen, graphics pad, etc.	2. Eliminated.

RESPONDENTS	SUGGESTIONS	DISPOSITION
	B. Grades 3-5 . . . will use robotic devices.	B. Grades 3-5 Eliminated.
	C. Grades 6-8 1. . . . will discrimminate among programming languages such as business, scientific/numeric, structured programming and authorizing.	C. Grades 6-8 1. Eliminated.
	2. . . . will describe changes in artificial intelligence.	2. Eliminated.
St. Mary's	Elementary guide fine as is.	Went back to original version.

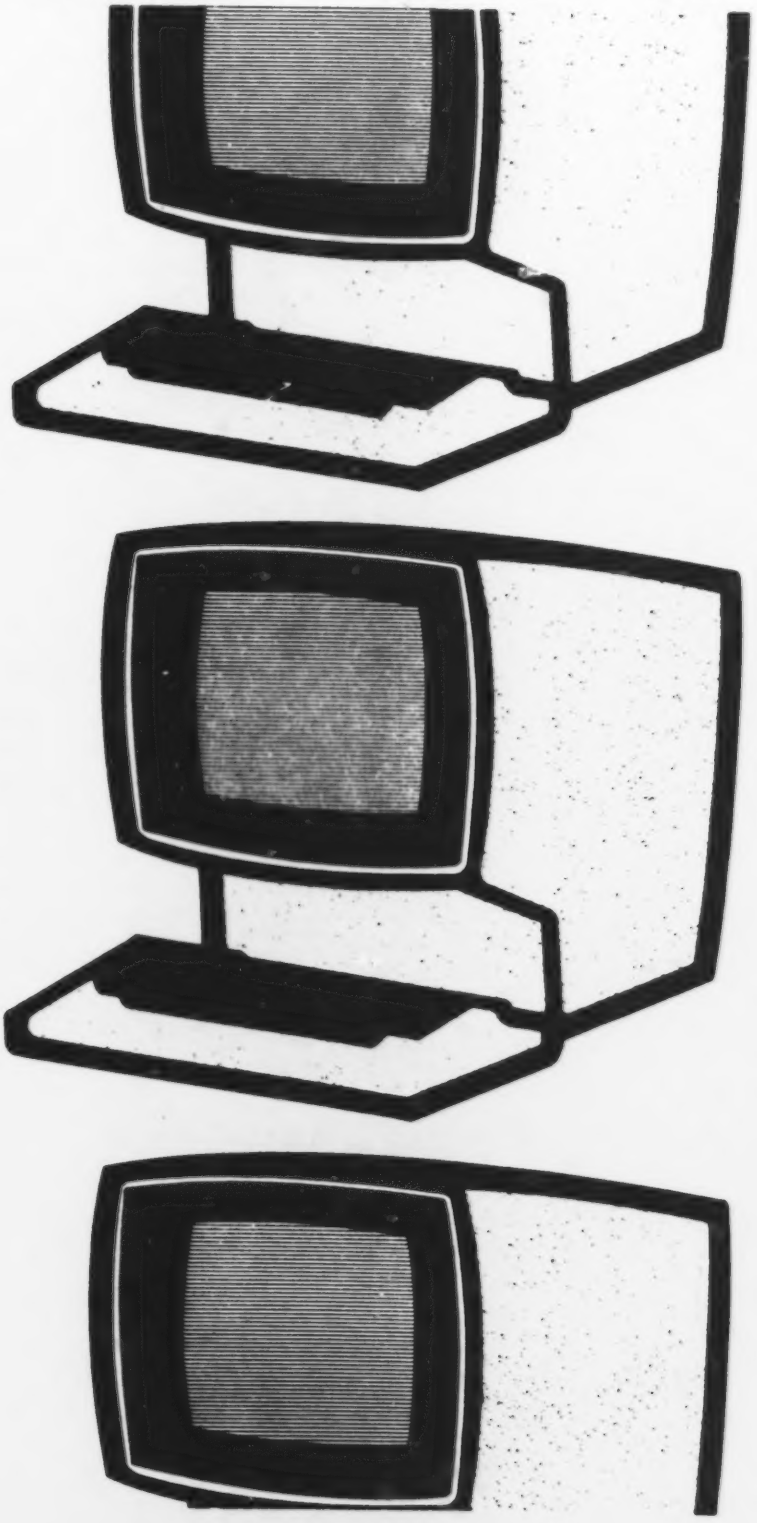
ALASKA
MODEL
CURRICULUM
GUIDE
PROJECT

Subject: COMPUTER ED
Course:
Level: ELEMENTARY
Grade(s): 1-8
Date: 8-20-85

PERCENTAGE OF
EDUCATIONAL OUTCOMES

Objective	N	%	Histogram of Percentages (10 20 30 40 50 60 70 80 90 100)
COGNITIVE			
1.10 Knowledge of specifics	3	13	*******
1.20 Knowledge of ways and means of dealing with specifics	0	0	
1.30 Knowledge of universals and abstractions	0	0	
2.00 Comprehension	15	63	**********
3.00 Application	5	21	**********
4.00 Analysis	0	0	
5.00 Synthesis	1	4	**
6.00 Evaluation	0	0	
SUBTOTAL	24	100	
AFFECTIVE	0	0	
PSYCHOMOTOR	0	0	
Not Classifiable	0	0	
TOTAL	24	100	

Computer Education



Alaska
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SECONDARY COMPUTER EDUCATION

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My definition of an educated person is one who knows the right thing to do at the time it has been done.

After Charles Kettering

PREFACE TO THE SERIES

Among the many decisions that schools must make, none is more important than the choice of curriculum. Curriculum defines the intent behind instruction and the expectations for student performance. This first field edition curriculum guide is one of a series intended to serve as a model to aid school districts as they develop and review their own curriculum documents. It is not intended that any of these field edition guides be used directly by teachers for instructional purposes. Districts are expected to develop their own locally suitable curriculum based on these guides. Districts have or are developing their own locally suitable curriculum using these guides as a base and point of departure. In the future as schools use this material to plan and implement programs, its value will be measured by the increased abilities of students to learn, think, and perform as informed and productive citizens.

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Pete Larson, Kenai
Della Mathis, Anchorage
Jerry Myers, Skagway
Ed Obie, DOE
Louise Peterman, Anchorage
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SECONDARY COMPUTER EDUCATION
GRADES 9-12

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
COMPUTER OPERATION: Understanding and using the vocabulary, definitions and operational procedures associated with computers, and their peripherals as appropriate to needs and interest.	Use peripheral devices.	Use input devices such as mouse, modem, voice, light pen, graphics pad, scientific measuring equipment. Use output devices such as printer, speech synthesizer, plotter. Use robotic devices.
COMPUTER APPLICATION: Using computer hardware and software as tools and apply this knowledge to the solution of problems.	Use software and hardware in order to solve problems.	

SECONDARY COMPUTER EDUCATION
GRADES 9-12

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
COMPUTER APPLICATION		
		Use word processor.
		Use data bases and information retrieval systems.
		Use spread sheet programs.
		Use filing system programs.
	Identify procedures for choosing software and hardware.	
		Describe characteristics of good software and hardware.
		Choose software and hardware to solve specific problems.
PROBLEM SOLVING: Developing problem solving skills by understanding and using programming languages.		
	Write programs to solve problems.	
		Write well-organized computer programs.

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
PROBLEM SOLVING		
		Use a variety of data structures.
		Use the syntax and semantics of various computer programming languages.
	Describe the nature and purposes of computer languages and programming.	
		Predict output of program.
		Discriminate among programming languages such as business, scientific/numeric, structured programming, and authoring.
COMPUTERS IN SOCIETY: Being familiar with: (1) the technical development of computer devices. (2) the impact of technology on society. (3) career, vocational, home, and recreational areas of computers. (4) emerging roles of computers and ways to make use of them in a changing society.		
	Describe personal and vocational uses of the computer.	

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
COMPUTERS IN SOCIETY (Cont.)		Describe Career/Vocational uses of the computer.
		Describe home uses of the computer.
		Describe recreational uses of the computer.
	Differentiate between responsible and irresponsible uses of computer technology.	
		Use computers in ways which do not neglect or violate the rights of others.
	Identify the positive and negative impact of computer technology on society.	
		Describe advantages of using computers.
		Describe disadvantages of using computers.
	Demonstrate an awareness of historical developments of computing devices.	
		Identify devices for manipulating numbers.
		Identify technological advances leading to different generations of computers.
	Demonstrate an awareness of changes related to technological developments.	

SECONDARY COMPUTER EDUCATION
GRADES 9-12

TOPIC/CONCEPT	LEARNING OUTCOME The Learner will:	SAMPLE LEARNING OBJECTIVE The Learner will:
COMPUTERS IN SOCIETY (Cont.)		Use telecommunication as available in the local community.
		Describe changes in artificial intelligence.
		Describe new developments in computer applications.

ALASKA CURRICULUM GUIDE: Computer Education - Secondary

RESPONDENTS	SUGGESTIONS	DISPOSITION
Sandra Burgess, representing Alaska Association for Computer Education		
	. . . will describe changes in robotics.	Eliminated.
St. Mary's	Secondary guide needs revisions along lines suggested by Leroy Finkel.	Ignored this suggestion since weight of opinion from Association was in other direction.

ALASKA
MODEL
CURRICULUM
GUIDE
PROJECT

Subject: COMPUTER ED
Course:
Level: SECONDARY
Grade(s): 9-12
Date: 8-20-85

PERCENTAGE OF EDUCATIONAL OUTCOMES

Objective	N	%	Histogram of Percentages (10 20 30 40 50 60 70 80 90 100)
COGNITIVE			
1.10 Knowledge of specifics	1	11	******
1.20 Knowledge of ways and means of dealing with specifics	0	0	
1.30 Knowledge of universals and abstractions	0	0	
2.00 Comprehension	4	44	**********
3.00 Application	3	33	**********
4.00 Analysis	0	0	
5.00 Synthesis	1	11	******
6.00 Evaluation	0	0	
SUBTOTAL	9	100	
AFFECTIVE	0	0	
PSYCHOMOTOR	0	0	
Not Classifiable	0	0	
TOTAL	9	100	